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UNITED STATES PUBLIC HEALTH SERVICE

WHAT THE FARMER CAN DO TO PREVENT MALARIA

BY

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WHAT THE FARMER CAN DO TO PREVENT MALARIA.

By R. H. VON EZDORF, Surgeon, United States Public Health Service.

There are two fundamental principles which must first be understood and accepted, as upon them are based the measures to be adopted for the prevention of malaria.

1. Malaria is contracted only through the bite of a special mosquito.

2. Man infects the mosquito, and the mosquito in turn infects man.

These conditions absolutely exclude air, water, and food as being methods by which malaria may be contracted. The mosquito is not born with the malaria germs, but to get them must first bite a person who has them in his blood.

Malaria is a disease due to a germ which lives in the red blood cells in the blood of man. This germ is a small animal, unlike the germs which cause typhoid fever, diphtheria, and tuberculosis, which are vegetables. The life of the malaria germ requires different conditions for its existence and continuance from that of other germs.

The chain of life of the malaria germ is:

Man—to—Mosquito—to—Man.

To prevent malaria we must, therefore, break the chain somewhere, and for this we may consider the question under two heads.

Avoid the Bite of the Mosquito.

This requires a knowledge of the life and habits of the mosquito which is responsible for transmitting malaria.

The malaria-bearing mosquito usually bites at dusk or twilight or some time during the hours between sunset and sunrise. It will also bite, if hungry, in a dark and shady place during the day, but the usual time is about sunset. It is therefore prudent to avoid the bite of mosquitoes at those hours.

Screening and mosquito bars.—Two measures, easy of adoption, will give protection. These are screening of the bed room, or preferably the whole house, and the use of mosquito bars.

In screening the house, this must be absolute. Windows and doors must be tight, the windows should be entirely screened, and not half-way or with telescoping screens. The doors must be well fitting. The wire gauze should be of a small mesh, an 18-mesh

wire, which means that there are 18 strands to the inch. The fireplace in the room must also be absolutely closed against the possible entrance of mosquitoes. Heavy paper, or better still, cotton cloth nailed down over the fireplace with strips of lathing over the edges of the cloth to insure a tight fit, will suffice. If the fireplace will not permit of tacking down of such material this may be fastened into place by use of strips of adhesive plaster.

The use of mosquito nets over beds will give a certain amount of protection. They should be amply large so that they may be easily tucked in under the mattresses. They should never be allowed to hang down to the floor. The reason for this is that mosquitoes may and do hide under the beds during the daytime, and thus may be able to gain access to the sleeping individual at night unless this precaution is taken. Great care is necessary to see that mosquito nets are always in good repair, as a single tear or hole will allow the entrance of mosquitoes.

Destruction of breeding places of mosquitoes.—Mosquitoes breed in any standing water. The malaria-bearing mosquito likes shallow pools, protected by shade, grass or other vegetation such as may be found in poorly drained ditches; marshy places in the woods; hoof prints of cattle and horses along the edge of a branch, creek, or bayou; hog wallows; and sometimes troughs, barrels, and the like.

Mosquitoes lay their eggs on such collections of water. These hatch into larvæ or "wiggle tails," then into pupæ, and finally change into mosquitoes, requiring 9 to 15 days for development from egg to mosquito.

To get rid of such standing water, subsoil drains, the filling up of low places, and the emptying of water containers at least once each week, are necessary. Drainage is simple but often costly, yet if done it will do away permanently with a source of the trouble.

Kerosene oil poured on the water 1 to 2 ounces for every 15 square feet of surface may be employed to kill the "wiggle tails" or larvæ. This measure may be used in barrels or other water containers, but must be repeated every week. The emptying and wiping out of water containers such as are found in chicken yards, stables, etc., before refilling with water, will serve all practical purposes.

The farmer should adopt the screening measure first and then look after the destruction of breeding places for mosquitoes.

Use Quinine as a Prophylactic Measure.

Quinine is specific in curing the disease, and also in preventing it.

The active symptoms of malaria are easily controlled by the proper administration of quinine, but unfortunately the individual who suffers with malaria does not usually keep it up long enough to

free his system entirely of the malaria germ. As a result, persons frequently carry the germ in the blood without having active symptoms of the disease, and on being bitten by mosquitoes spread the infection.

The first principle, therefore, is that every one suffering with malarial fever should continue treatment long enough to prevent his infecting mosquitoes and to avoid the possibility of developing a relapse.

Quinine, if taken regularly, will also prevent malaria. Persons exposed to malaria should, therefore, take small doses of quinine.

Quinine, in 5-grain doses for adults, taken morning and evening on two consecutive days each week, say, Saturday morning and evening and Sunday morning and evening, from May 1 to November 1 or December 1, will prevent malaria. Where persons are unusually exposed at night in highly malarious regions, 3 to 5 grains of quinine should be taken daily during the height of the malarial season, August and September, and on two consecutive days a week during the remaining period.

The cost.—Quinine may be bought at from 50 cents to 60 cents an ounce, equal to 480 grains. One hundred capsules with a capacity of 5 grains each will cost 15 cents. An ounce of quinine and 100 capsules will be sufficient for 24 weeks, using 20 grains of quinine each week.

The single dose for a child should be 1 grain for each 3 years of age; a child of 10 years would therefore receive 3 grains at a dose, a total of 6 grains a day, or 12 grains a week.

At a cost of 75 cents to \$1 an adult may remain free from malaria for the entire year. A person may choose to take 3 grains a day, which is a good tonic dose and acts as a preventive. An ounce of quinine would then be sufficient for 160 days.

It is always well for a person to continue the use of quinine for one month beyond the malarial season. In the South malaria prevails mostly during the months of June, July, August, and September. It decreases in October, and markedly in November. Continue quinine, therefore, to December 1.

Chill tonics are popular among farmers. It should be known that the good effect of chill tonics is from the quinine they contain. Most of these preparations are put up in bottles of 8 ounces, and each teaspoonful contains 1 grain of quinine. Each bottle of 8 ounces, therefore, contains 64 grains, or 64 teaspoonful doses.

The dose usually prescribed for adults is 1 tablespoonful, which represents 4 grains. The regular price for a bottle is 50 cents.

The bottle of chill tonic for an adult would, therefore, be enough for only three weeks and two bottles for six weeks, as against the

simple purchase of quinine and capsules at the same price, which will suffice for six months. The continued use of quinine will do no harm.

There are people who say they can not take quinine. Such persons should avoid the bites of the mosquitoes (at night).

Summary.

To prevent malaria, therefore, use all measures.

Screen your houses and make them mosquito proof.

Use mosquito bars over beds if the house is not well screened.

Use quinine, which will keep your system free from the malaria germ.

To prevent the breeding of mosquitoes, clear ditches of grass and weeds and do away with stagnant water.

Examples of Benefits from Antimalaria Work.

One example of the good effect of screening and the economic benefit derived therefrom, cited to me by Dr. Henry Thibault, is here given:

A farmer's family of nine members, living in Arkansas, gave a history of having suffered attacks of malarial fevers every season during three years. The medical attendance cost an average of \$175 each year. Under the direction of Dr. Henry Thibault, the attending physician, measures were taken against the breeding of mosquitoes in and about the home, and the screening of all windows, doors, and open hallways was adopted. The family remained free from malaria and lived in the same home four years, and the bills for medical attendance averaged only \$15 to \$20 each year thereafter.

It was estimated that the cost of screening the house in this instance was \$40. The cost of medical attendance before screening was \$175 a year and after screening \$15 to \$20 a year.

The following is an illustration of the practical application of quinine as a prophylactic measure:

In a family living in North Carolina, in a mill town where malarial fevers prevailed to a great extent, each of the 10 members of one family took 3 grains of quinine in capsules, daily, beginning June 1. On September 20 one member of this family decided not to continue the use of quinine, and on October 13 this member developed malarial fever, the other nine remaining in perfect health. Malarial fever prevailed among families in the immediate neighborhood where this particular family resided. This instance occurred in the practice of Dr. T. W. M. Long.